WHAT IS CLAIMED IS:

1. A combiner for use in a diversity radio receiver which receives a plurality of diversity I and Q modulated signals each carrying I and Q information signals, wherein said received I and Q signal pairs are digitized at a sampling rate T and converted to baseband I and Q signals wherein each said converted I and Q signal pair represents a diversity I and Q vector for input to said combiner, said combiner comprising:

(a) for each sample stream of said plurality of diversity I and Q vectors input to said combiner, a discriminator configured for producing for each sample an output discriminated I and Q vector (I_Δ, Q_Δ) having a phase representative of the frequency of said information signals and an amplitude proportional to the power of said information signals;

(b) Adders configured for adding together, for each set of sampled diversity vectors, said discriminated I signals (I_Δ) to produce a combined discriminated I signal ($I_{c\Delta}$) and for adding together, for each sample of said diversity vectors, said discriminated Q signals (Q_Δ) to produce a combined discriminated Q signal ($Q_{c\Delta}$), whereby said combined discriminated I and Q signals represent a combined discriminated vector ($I_{c\Delta}$, $Q_{c\Delta}$) having a phase which is determined by one or more of the phases of said diversity I and Q vectors depending upon the relative powers of said diversity I and Q vectors;

(c) a phase accumulator configured for adding to an accumulation vector, over successive samples, said phases of said combined discriminated vectors ($I_{c\Delta}$, $Q_{c\Delta}$) to produce an output combined I and Q signal pair (I_c, Q_c).

2. A combiner according to claim 1 wherein said discriminator is a complex discriminator.

3. A combiner according to claim 2 wherein said received diversity I and Q signals are FM signals.

4. A combiner according to claim 3 wherein said complex discriminator is configured to perform the calculations:

$I_{\Delta}(t) = I(t)\,I(t-T) + Q(t)\,Q(t-T)$; and,

$Q_{\Delta}(t) = I(t-T)\,Q(t) - I(t)\,Q(t-T)$.

5. A combiner according to claim 4 wherein said phase accumulator is configured to perform the calculations:

$I_c(t) = I_{c\Delta}(t)\,I_c(t-T) - Q_{c\Delta}(t)\,Q_c(t-T)$; and,

$Q_c(t) = I_{c\Delta}(t)\,Q_c(t-T) + I_c(t-T)\,Q_{c\Delta}(t)$.

6. A combiner according to claim 5 wherein said phase accumulator comprises a normalizer component configured for producing a normalizing signal for normalizing said accumulation vector $(I_c(t-T), Q_c(t-T))$ following each said successive accumulation.

7. A combiner according to claim 6 wherein the magnitude of said normalizing signal is substantially equal to $1/\mathrm{sqrt}(I_c^2 + Q_c^2)$.

8. A combiner according to claim 6 wherein the magnitude of said normalizing signal approximates $1/\mathrm{sqrt}(I_c^2 + Q_c^2)$, said normalizer component comprising a bit register which receives the value of $I_c^2 + Q_c^2$ following each said successive accumulation and logic gates configured for determining a number "n" of bit shifts to be applied to $I_c(t-T)$ and $Q_c(t-T)$ to produce a normalized vector whose magnitude is between .5 and 1.0.

9. A combiner according to claim 6 wherein said plurality of diversity signals comprise two diversity I and Q modulated signals.

10. A combiner according to claim 7 wherein said diversity signals are spatial diversity I and Q modulated signals.

11. A combiner according to claim 3 wherein said phase accumulator is configured for deriving the arctangent of the vector I_c (t-T) + j Q_c (t-T), adding the derived angle to said accumulation phase (modulo 2π) and applying a cosine and a sine function to the resulting angle to produce said combined I and Q signal pair (I_c, Q_c).

12. A method for combining a plurality of diversity baseband I and Q modulated signals each carrying an I and Q information signal, said modulated signals having been digitized at a sampling rate T and each I and Q signal pair representing a diversity I and Q vector, said method comprising the steps:

(a) for each sample stream of said plurality of diversity I and Q vectors, discriminating each sample to produce a discriminated I and Q vector (I_Δ, Q_Δ) having a phase representative of the frequency of said information signal and an amplitude proportional to the power of said information signal;

(b) producing a combined discriminated I signal ($I_{c\Delta}$) by adding together, for each set of sampled diversity vectors, said discriminated I signals (I_Δ) and producing a combined discriminated Q signal ($Q_{c\Delta}$) by adding together, for each sample of said diversity vectors, said discriminated Q signals (Q_Δ), whereby said combined discriminated I and Q signals represent a combined discriminated vector ($I_{c\Delta}$, $Q_{c\Delta}$) having a phase which is determined by one or more of the phases of said diversity I and Q vectors depending upon the relative powers of said diversity I and Q vectors;

(c) producing a combined I and Q signal pair (I_c, Q_c) by adding said phases of said combined discriminated vectors ($I_{c\Delta}$, $Q_{c\Delta}$) over successive samples.

13. A method according to claim 12 whereby said in said discriminating step performs complex discrimination.

14. A method according to claim 13 whereby said diversity I and Q signals are FM signals.

15. A method according to claim 14 whereby said complex discrimination achieves the calculations:

$I_\Delta(t) = I(t)\, I(t-T) + Q(t)\, Q(t-T)$; and,

$Q_\Delta(t) = I(t-T)\, Q(t) - I(t)\, Q(t-T)$.

16. A method according to claim 15 whereby said adding of said phases of said combined discriminated vectors ($I_{c\Delta}$, $Q_{c\Delta}$) achieves the calculations:

$I_c(t) = I_{c\Delta}(t)\, I_c(t-T) - Q_{c\Delta}(t)\, Q_c(t-T)$; and,

$Q_c(t) = I_{c\Delta}(t)\, Q_c(t-T) + I_c(t-T)\, Q_{c\Delta}(t)$.

17. A method according to claim 16 whereby an accumulation vector ($I_c(t-T)$,$Q_c(t-T)$) is normalized following each successive addition.

18. A method according to claim 17 whereby said normalization comprises multiplying said accumulation vector by an amount substantially equal to $1/\mathrm{sqrt}(I_c^2 + Q_c^2)$.

19. A method according to claim 17 whereby said normalization comprises multiplying said accumulation vector by 2^n, whereby the value of "n" is determined such that the magnitude of said normalized vector is between .5 and 1.0.